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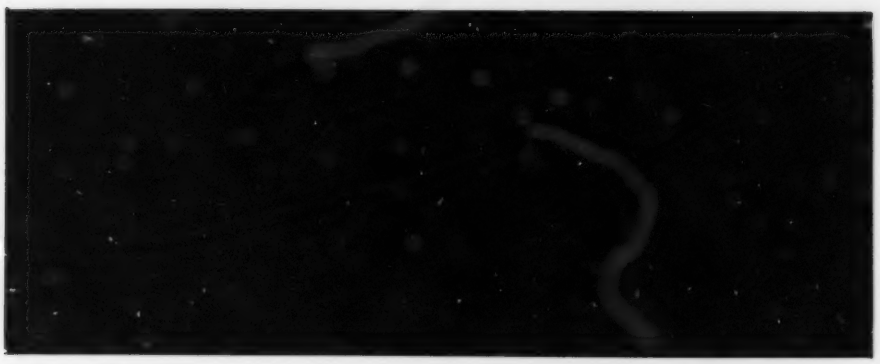

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Final Report

R-89-01-0483

Completion of Specific Studies into BRD Bovine Abortion, and Neonatal Calf Loss and Analysis of Results

Funded by
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FINAL REPORT

Completion of Specific Studies into BRD, Bovine Abortion, and Neonatal Calf Loss and Analysis of Results.

Project No. R-89-01-0483

E.D. Janzen

Executive Summary

1.1 Abstract

1.2 Summary in lay terms

Technical Report

2.1 Abstract

2.2 Background and Objectives

2.3 Experimental Methods

2.4 Results and Discussions

2.5 Conclusions and Impact

2.6 List of papers prepared and talks given

2.7 Verified statement of expenditures

2.8 List of personnel involved, percentage of time

2.9 List of equipment items in excess of $500

EXECUTIVE SUMMARY

1.1 Abstract

The major objective of Project R-89-01-0483 was to provide supporting funds for a professional associate to complete several projects important to beef production in Saskatchewan.

Project 1: Campylobacter jejuni was identified as the infectious cause of two abortion storms. Its zoonotic (human and animal) potential and importance as a cause of abortion were identified.

Project 2: The efficacy of a bovine respiratory syncytial virus (BRSV) vaccine was evaluated in 5 field trials. This vaccine had a variable effect on subsequent treatment for respiratory disease.

Project 3: Pelvimetry was found to be a poor on-farm test for predicting dystocia in replacement beef heifers.

Project 4: Analysis of data at a large Saskatchewan feedlot revealed a mortality rate in feedlot calves of 2.4%, with pneumonia accounting for 36% of deaths and hemophilosis accounting for 47% of deaths. VIDO's Pasteurella hemolytica vaccine was successfully evaluated in some of these calves.

1.2 Summary

During 1987-1989 several disease and production projects were initiated in Saskatchewan and additional funding was required to hire a professional associate to complete these projects.

The first project involved the follow-up and completion of a herd investigation that was initiated in the spring of 1989 under the ERDA Project 2.4-31. An unusual infectious cause of bovine abortions was identified in two abortion outbreaks in neighboring beef cow herds. The bacteria Campylobacter jejuni was isolated with variable frequency from healthy and sick animals in the two affected herds, and from healthy cattle in neighboring ranches. Wildlife were suspected as a source of this bacteria but sampling of pronghorn antelope and mule deer during the 1989 fall hunting season failed to substantiate this theory. Based on this field investigation, it was hypothesized that the source and mode of transmission of C jejuni was fecal contamination of water supplies and feeding grounds by carrier cows or wildlife.

The second project involved completion of two years of work in evaluating the efficacy of BRSV vaccination in beef cattle when immunized prior to weaning, at weaning, or immediately upon arrival at the feedlot. In 5 field trials, the BRSV vaccine had a variable effect on subsequent treatment for respiratory disease. Although the trend was to a beneficial effect of the BRSV vaccine, it was questionable whether the small reduction in treatment rate would justify the cost of a vaccination program.

In the third project, the usefulness of pelvic area measurements as an on-farm test for predicting calving difficulty was evaluated in four beef cow herds. Pelvic area measurements in replacement heifers prior to the breeding season and at the time of pregnancy examination were found to be poor tests for predicting dystocia. Standard pelvic area and calf birth weight ratios were not useful in estimating a deliverable calf birth weight.

In the fourth project, veterinary input was required to assist in monitoring cattle and maintaining records at a large feedlot in central Saskatchewan. This feedlot is a client of WCVM's Ambulatory Clinic and also involved in field trials that evaluate VIDO's respiratory vaccines. From September 1989 to January 1990, 27% of the calves were treated for respiratory

disease. During this time-frame, 2.4% of the calves died; 36% from pneumonia and 47% from various manifestations of hemophilosis. Because of sufficient numbers of calves, moderate-high disease levels, and excellent records, VIDO personnel were able to evaluate the efficacy of their experimental Pasteurella hemolytica vaccine.

TECHNICAL REPORT

2.1 Abstract

A professional associate was hired to complete several projects that had been initiated in 1987-89 and were of importance to beef production in Saskatchewan.

The first project involved an indepth investigation into two abortion storms in beef cattle on neighboring ranches. An unusual infectious cause of abortion was identified and the epidemiological features of this disease studied.

The second project involved completion and publication of results of 5 field trials that evaluated the efficacy of a commercial BRSV vaccine in beef cattle. This vaccine was found to have a variable effect on treatment for respiratory disease and its economic value was questioned.

In the third project, results of a field study that evaluated the usefulness of pelvimetry were published in the scientific and lay journals and discussed in seminars to producers and veterinarians. Pelvimetry was found to be of no value in the four beef herds that were studied.

Finally, veterinary input was required to help in the animal health management of cattle at a large commercial feedlot in Saskatchewan, whose calves were being used in a field trial to evaluate VIDO's experimental Pasteurella hemolytica vaccine.

2.2 Background and Objectives

Project 1

A disease investigative unit at WCVM has been developed and maintained through ERDA Project 2.4-31. Its objective is to investigate disease and production problems in Saskatchewan in conjunction with private practitioners, their producer clients, and other associated professionals. Occasionally such herd investigations identify problems that require further research and directed effort beyond that covered by the mandate of Project 2.4-31. One such herd investigation involved the study of Campylobacter jejuni abortion storms in two beef cattle herds in southern Saskatchewan. Since this bacteria is a rare cause of bovine abortion, an indepth study on its prevalence and occurrence was indicated, in the hopes of learning how to prevent and control this disease.

Project 2

In the early 1980's, bovine respiratory syncytial virus (BRSV) was identified as an important cause of respiratory disease in cattle. Vaccines against this viral infection became commercially available yet there were few reports on their efficacy in the field. Therefore, 5 field trials were undertaken in Alberta and Saskatchewan during 1987-89 to evaluate the efficacy of commercial BRSV vaccines. Although the field trials were completed in 1989, further work was required to complete analysis of the data and publicize the results to veterinarians and producers.

Project 3

Calving difficulty in heifers continues to be a major problem in beef cattle production. In recent years, measuring the pelvic area of the dam to predict dystocia has once again become popular. Very few objective field studies, however, have evaluated the usefulness of this test and its economic feasibility. Therefore, a field study in four beef herds in Saskatchewan was undertaken to critically evaluate the value of this on-farm test. The results of this study were publicized to veterinarians and producers through publications and seminars.

Project 4

Pneumonia continues to be one of the major health problems in feedlot cattle and new vaccines against this disease complex are being developed but they require field testing in the feedlot to determine their efficacy. WCVM's Ambulatory Clinic has gone a long way to help develop an animal health management program at a large commercial feedlot in central Saskatchewan. Calves at this facility were chosen to evaluate VIDO's experimental Pasteurella hemolytica vaccine. Additional veterinary input, however, was required to monitor cattle and maintain health records at this feedlot.

2.3 Experimental Methods

The specific experimental methods involved in each project are given in detail in the publications on each specific topic (refer to 2.6). In general, the professional associate was involved in the entire field studies, from design to final publication and presentation of results through seminars to veterinarians and producers.

2.4 Results and Discussion

Project 1

Campylobacter jejuni was identified as the cause of two abortion storms in neighboring ranches in southern Saskatchewan. This bacteria was isolated with variable frequency from fecal samples of healthy and sick animals in the two affected herds, and from fecal samples of healthy cattle in neighboring ranches. It was hypothesized that the source and mode of transmission of C. jejuni was fecal contamination of water supplies and feeding grounds by carrier cows or wildlife.

Project 2

BRSV vaccination was found to have a variable effect on subsequent treatment of respiratory disease in beef cattle when immunized prior to weaning, at weaning, or immediately upon arrival at the feedlot.

Project 3

The prevalence of calving difficulty in four beef herds in Saskatchewan ranged form 15-34%. Pelvic area measurements prior to the breeding season and at the time of pregnancy examination were poor on-farm tests for predicting calving difficulty in beef heifers. Standard pelvic area and calf birth weight ratios were not useful in estimating deliverable calf birth weight.

Project 4

From September 1989 to January 1990, 27% of the calves at a large commercial feedlot in central Saskatchewan were treated for bovine respiratory disease (BRD). During this time-frame, 2.4% of the calves died, 36% from pneumonia and 47% from various manifestations of hemophilosis. This feedlot proved to be an excellent facility for field testing vaccines.

2.5 Conclusions and Impact

Project 1

The Campylobacter jejuni serotypes isolated in these cattle were similar to those isolated from cases of human enteritis, emphasizing the zoonotic significance of this bacteria. This study identified C. jejuni as an infectious agent to be considered in the differential diagnosis of bovine abortions.

Project 2

The trend in the 5 field trials was to a beneficial effect of the commercial BRSV vaccine. The small reduction in treatment rate, however, may not justify the cost of the vaccination program. Veterinarians and producers, thus, should not routinely vaccinate all cattle against BRSV, but consider the risk of each group of cattle to the disease and the expected reductions in treatment rate and based on this, decide whether the cost of vaccination can be justified.

Project 3

Pelvic area measurements were evaluated as they are currently used by practitioners and producers. In a field study in 4 beef herds in Saskatchewan, pelvimetry was not a useful tool in selecting heifers for minimal calving difficulty. These results conflict with other findings suggesting that pelvic area measurements can be used to select heifers for calving ease. Our findings, however, are consistent with the finding from many studies that pelvic area accounts for only a small proportion of the variability in dystocia. Further objective field studies are required to determine whether or not pelvimetry is a cost effective management tool to be recommended to cow-calf producers.

Project 4

Pneumonia was a significant health problem in feedlot calves at a large commercial feedlot in Saskatchewan, both in terms of costs of treatment and death losses. This feedlot proved to be an excellent facility to evaluate the efficacy of VIDO's experimental Pasteurella hemolytica vaccine because: excellent health records were maintained; all dead animals were necropsied by attending veterinarians; and sufficient numbers of calves and disease levels were present. Only through controlled field trials can vaccines, treatments, and management regimes be critically evaluated and their cost effectiveness determined.

2.6 List of papers prepared and talks given

Published Papers

Project 1

1. Van Donkersgoed J, Janzen ED, et al. Campylobacter jejuni abortion in beef cattle. Can Vet J 1989; 30: 560.

2. Van Donkersgoed J, Janzen ED, et al. Prevalence of Campylobacter jejuni in pronghorn and mule deer in southern Saskatchewan. Can Vet J 1990; 31: 302-303.

3. Van Donkersgoed J, Janzen ED, et al. Campylobacter jejuni abortions in two beef cattle herds in Saskatchewan. Can Vet J 1990; 31: 373-377.

4. Van Donkersgoed J. Rare bug causes abortions. Cattlemen, February 1990. pages 32-33.

Project 2

1. Van Donkersgoed J, Janzen ED, et al. Five field trials on the efficacy of a bovine respiratory syncytial virus vaccine. Can Vet J 1990; 31: 93-100.

2. Van Donkersgoed J. A review of BRSV in western Canada. Proceedings of Feedlot Health Managment Services Annual Research Seminar. June 9, 1989. Calgary, Alberta.

3. Van Donkersgoed J. Efficacy of BRSV vaccine variable. Cattlemen. November 1989, page 50.

4. Value of BRSV vaccine questioned. Country Guide. April 1990. page 32.

Project 3

1. Van Donkersgoed J, et al. The usefulness of pelvic area measurements as an on-farm test for predicting calving difficulty in beef heifers. Can Vet J 1990; 31: 190-193.

2. Van Donkersgoed J, et al. Pelvic measurements in beef replacement heifers. University of Saskatchewan Beef Research Report. 1989. pages 40-41.

3. Van Donkersgoed J. Researchers question use of pelvic measurements. Cattlemen. February 1990. page 36.

4. Van Donkersgoed J, et al. The usefulness of pelvic area measurements as an on-farm test for predicting calving difficulty in beef heifers. University of Saskatchewan Beef Research Report. 1990. pages 33-37.

Project 4

1. Van Donkersgoed J. Introduction of cattle to the feedlot. In: Lotfeeding and Beef Production. pages 151-155. Proceedings 137. June 25-29, 1990. Post Graduate Committee in Veterinary Science, University of Sydney, Australia.

2. Van Donkersgoed J. Management of bovine respiratory disease in feedlots. In: Lotfeeding and Beef Production. pages 179 -183. Proceedings 137, June 25-29, 1990. Post Graduate Committee in Veterinary Science, University of Sydney, Australia.

Talks Given

Project 1

1. Van Donkersgoed J. Campylobacter jejuni abortions. Presented to veterinarians at WCVM's Summer Conference. June 1989.

Project 2

1. Van Donkersgoed J. A review of BRSV in western Canada. Presented to veterinarians and producers at Feedlot Health Management Services Annual Research Seminar, Calgary, June 1989.

2. Van Donkersgoed J. Field evaluations of BRSV vaccines. Presented to veterinarians at WCVM's Summer Conference. June 1990.

3. Van Donkersgoed J. Overview of BRSV. Presented to technical staff of Boehringer Ingelheim during CVMA Convention at Halifax, July 1990.

Project 3

1. Van Donkersgoed J. Bovine pelvimetry - Can it reduce calving problems. Presented to veterinarians and producers at Feedlot Health Management Services Annual Research Seminar, Calgary. June 1990.

2. Van Donkersgoed J. The usefulness of pelvic area measurements. Presented to producers at Termuende Ranch Research Field Day, Lanigan, June 1990.

Project 4

1. Van Donkersgoed J. Feedlot processing. Presented to veterinary students and faculty at WCVM's Student A.A.B.P. meeting, September 1989.

2. Van Donkersgoed J. Management of bovine respiratory disease. Presented to veterinary students and faculty at WCVM's Student A.A.B.P. meeting, September 1990.

2.7 Verified List of Expenditures

7-74278
R-89-01-0483

UNIVERSITY OF SASKATCHEWAN
Agriculture Development Fund
"Completion of Specific Investigations into BRD,
Bovine Abortion and Neonatal Calf Loss & Analysis of Results"
Under the Direction of E.D. JANZEN, HERD MEDICINE & THERIOGENOLOGY
Statement of Receipts and Expenditures for the Period
September 29, 1989 - June 30, 1990

Receipts

Government of Saskatchewan - December, 1989		$22,000.00

Expenditures

Salary	$24,177.29	
Fringe Benefits	1,532.77	
Materials & Supplies	479.84	
Fax	36.27	
Travel	773.83	27,000.00
Overexpenditure as of September 30, 1990		$ (5,000.00)

COPY FOR YOUR RECORDS

PROJECT DIRECTOR

M.G. SMITH
RESEARCH ACCOUNTANT

2.8 List of personnel time involved in projects

Personnel	Person-days
Professional:	
Van Donkersgoed J	180
Janzen ED	20
Others	5
Technical	10
Secretarial	15
Total	230

2.9 . List of equipment items in excess of $500

None purchased.